

USYAKS: A Science-Based Registry

Newsletter Summer 2022

Una Taylor, Editor



Feature Photo!



**Sage Hill Ranch
Gunnison, CO**

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A short note from the president

Summer is upon us and you are likely playing with new babies or perhaps in the middle of calving. If your grass is green, this is a rewarding time of year!

As an USYAKS member, with calving comes a responsibility. If you have a calf born with a suspected birth defect, please report it on the USYAKS website. Your report goes directly to the scientists, bypassing USYAKS governance. The scientists will bank tissue samples, and if patterns emerge, they will be able to search for a genetic cause. I'm happy to report that so far, no patterns have emerged.

My wife, Una, and I have decided to retire from ranching yaks. We've been downsizing over the last couple of years, and the last 40+ are moving out before August 7. Starting Hay Springs Yaks was a second career for us after teaching in academia for years. We love our yaks dearly and will miss them terribly, but we are comforted because we know they are going to a good home.



**Sage Hill Ranch
Gunnison, CO**

Referendum Results: Revision to the Yak Registration Standard is Approved



The membership recently approved the Board's decision to accept the Science Committee's recommendation to revise (slightly) the registration standard. The revision is now in effect. The revision won't change the registration status of any yak that's already registered. On balance, the registration standard may be a bit tighter for a tad more yaks than it lowers the standard for. The science behind this change is a bit confusing, so in the interest of clarifying the reasons for reevaluating the registration standard, the following explanation is provided.

There are two things going on. Before the revision went into effect the standard was set at 95%, but it counted a particular type of mitochondrial DNA against the yak. If the animal had type "G" mitochondrial DNA, it got two strikes against it right off the bat. Prior to the referendum, type "G" mitochondrial DNA was counted as two cattle alleles during registration. Unlike *nuclear* DNA, **all mitochondrial DNA comes from the mother**. This is because sperm only passes *nuclear* DNA on to offspring, and not mitochondrial DNA. If you have a female with type "G", every calf from that female will have type "G" *mitochondrial* DNA. This will continue with each generation, forever; every descendant of that yak would have always started off with the Association counting its mitochondrial DNA as two cattle alleles. For example: If the DNA report said your yak has 1 cattle allele PLUS type "G" mitochondrial DNA (automatically 2 cattle alleles), the registration calculation is a total of 3 cattle alleles: 1+2=3.

Domestic yaks have two types of mitochondrial DNA. Most registered yaks have type "G" mitochondrial DNA. Therefore, before the referendum, most registered yaks started off with the Association counting them as having two cattle alleles before we ever even looked at the standard DNA (from the cell's nucleus). What the referendum did was to recommend that the two cattle alleles that are associated with type "G" mitochondrial DNA **NOT** be counted in the registration calculation.

The reason scientists recommended this change is the following: Looking at mitochondrial DNA not only reveals evidence of recent hybridization, it also reveals evidence of ancient hybridization thousands of years ago during domestication. Type "G" mitochondrial DNA is not the original mitochondrial DNA of wild yaks. The USYAKS DNA test can't distinguish between the mitochondrial DNA of ancient Asian cattle that arose during domestication, and the mitochondrial DNA of current North American cattle.

That's the first part of the change in evaluating DNA for registration purposes. Based on the latest science, the Science Committee determined that ***we shouldn't count mitochondrial DNA against a yak during registration***. Therefore, removing the mitochondrial DNA from the standard *actually lowers* the registration bar a bit for the majority of yaks, since the 2 cattle alleles associated with mitochondrial DNA will no longer be included in the cattle allele count.

The second part of the Science Committee's recommendation sort of balances out the first part. We've now examined the DNA of more than 800 yaks, and we've seen an unmistakable pattern develop. All of the yaks that have lived exclusively with yaks (and not with cattle) for generations have shown *no more* than 3% of their alleles to be cattle alleles. Hence, drawing the DNA line at 97% is a natural and logical conclusion to what the yaks have told us in terms how much cattle introgression is present. In fact, the majority of our yaks have between 0% and 0.5% cattle alleles.

So, the Science Committee believes that the yaks have spoken. Moving the (Nuclear DNA) standard from 95% to 97% may sound like a lot, but it really isn't. Since the 2 cattle alleles in type "G" mitochondrial DNA counted as 1.5%, our prior nuclear DNA standard really amounted to 96.5% and NOT 95% (for those yaks with type G mitochondrial DNA). ***For most yaks, the revision really only moves the nuclear DNA standard from about 96.5% to about 97%***. Since the yaks have told us that they have 3% (or fewer) cattle alleles, the Science Committee and the Board of Directors felt that animals should not be registered as yaks until they meet that 3% level of cattle alleles. Part 1 makes the registration standard a little less stringent. Part 2 makes the registration standard a little more stringent. Together the two changes mostly wash each other out. The revision is still important, though. The revision brings the registration standard into line with what the scientists and the yak data have shown us.

The USYAKS registry is a Science-Based registry; it is not a Birth-Right registry. Each animal is evaluated according to *its own* merits. By careful breeding practices, a yak can become a full member of the yak registry even though a parent was excluded from it. This is one of the fundamental principles that led to the founding of USYAKS. It is also possible that an owner who breeds two (full-blooded) yaks that have DNA profiles very close to the yak/hybrid line, will produce a hybrid. It works both ways. As a responsible breeder, please pay attention to your yaks' genetic profiles and use the on-line program "Match-A-Yak".



Membership Update and Participation

2022 has seen USYAKS gain many new members and reach nearly 1000 yaks in the registry. Many of our new members may not know much about the history of USYAKS, so here's the Cliffs Notes version. This Association was founded about four years ago, and it was based on a few simple ideas: (1) The Association should welcome member participation in governance; (2) The Association should use science to: preserve the purity and diversity of North American yaks; to manage the registry; and to inform policy.

Our Association can only be as strong as its membership. USYAKS welcomes all members to the table at our Board of Directors meetings, conducted via Zoom. Check-in to a Board meeting from time-to-time so that you can offer input that will keep the Board from being insulated from Association members. The Bylaws require Board members to put the needs of our collective herd above the desires of their own ranch. Check-in to a Board meeting from time-to-time to find out if your Board members are actually doing that!

Announcement of Elections! Get your Bio ready!

Summer is the agreed upon time of year for electing new members of the board, and there will be openings this year. USYAKS needs your expertise, and it needs your support.

Consequently, **this is a call for volunteers.**

To become a candidate for a Board position you'll need to provide the Secretary with a photo and brief bio that includes a description of what you can offer the Association. If you would like to volunteer, please send those materials to Caryn. We will be holding an election very soon.

The Association needs responsible, hard-working volunteers to serve on The Board of Directors. If you want more specific information, please reach out to our Secretary, Caryn DeRochie, at Secretary@USYAKS.org.

Please read about our Vision and Values here:

<https://www.usyaks.org/about/>

The Board consists of individuals with a diverse set of skills, each person offering their unique perspective in helping to run the Association effectively. In general, the Board needs detail-oriented people who will show initiative and are willing to step up to the plate when the need arises. The Board always needs people with organizational skills, writing skills, proof-reading skills, and computer skills, who are willing to use those skills on behalf of USYAKS. In addition, the Board needs people who are capable and eager to offer assistance to members of USYAKS in the specific areas of herd health, fiber, meat, and marketing, grooming, etc.



Below is a list of the responsibilities of a Board member, as outlined in the By-Laws:

- Be members of USYAKS throughout their tenure on the Board of Directors;
- Be able to attend a minimum of 90% of the regularly scheduled Board of Directors meetings and willing to work outside the scheduled Board meetings to accomplish the work of USYAKS;
- Serve the interests of the Association without any interest or intent to achieve or self-gain from serving on the Board;
- Bring a certain skill, knowledge or experience level which will benefit the work of USYAKS.
- Represent the needs and best interests of the membership of USYAKS in the fulfillment of Article 2, the purposes for which USYAKS was formed under IRC 501(c)5;
- Perform any and all duties required of them collectively or individually by law, by the articles of incorporation, or by these bylaws;
- Attend meetings of the Board of Directors, serve on at least one committee as a Board Representative, proactively represent USYAKS with yak breeders and within the potential yak and yak product marketplace;
- Act with integrity, respect and inclusiveness in all work related to USYAKS and with other Yak Associations
- Register their addresses with the Secretary of the Board of Directors of USYAKS
- Identify to the Board of Directors if they are aware of any issue in which they will have a conflict of interest and should be recused.

Yak Meat Production: Some Considerations

Vance Hawk



Perhaps you are the type of person who loves exotic meats; perhaps you've even tried it and fallen in love with the taste. Maybe you've just purchased your first yak starter herd, and now you're thinking that raising yaks for meat is the way to go. Well, I don't blame you! It's a great business to be in. But it's also not a decision to be taken lightly, and there are some things to consider before getting started. So, I've been in the yak game for a while, and I'd like to share some pointers with you that I wish I had known before I got into it. There are many different angles and aspects of the meat business, but in this article, I'd like to focus on some practical considerations regarding fresh cuts of meat.

First, shipping frozen meat cross country is prohibitively expensive. Trust me. When we first got into trying to sell yak meat, we started with the idea that selling meat to the fanciest restaurants in New York and Los Angeles was the way to go. You know...places like Delmonico's. I certainly had visions of grandeur in my head! I pictured Tom Cruise gnawing on a piece of buttery yak tenderloin after his most recent blockbuster, like *Mission Impossible 7*, ruminating on his success as the second greatest actor of all time. Yet reality proved to be very different. While it is true that there is demand for yak meat from those places, the hard fact is that if you are a start-up, it's difficult to build a customer base that is willing to pay for large enough quantities of meat to make the 2-day shipping cost effective. The problem with shipping frozen meat, at least that we ran across, is that it needs to be in an insulated container (at least 1 1/2" of Styrofoam), packed with dry ice, and sent 2-day shipping or faster.

Otherwise, you run the risk of your shipment thawing before reaching its destination. We were able to get customers who were interested in trying a new meat, but very few customers were interested in paying 40-50% of their bill in shipping costs on a repeat basis. For now, we decided to stick with trying to sell to consumers in the Black Hills region, and maybe expand into the Rockies. Keep in mind, we were primarily using FedEx and UPS, and had not ventured into refrigerated shippers.

Another thing is that restaurants typically only want one type of cut. Restaurants can be great repeat customers, but they usually only want a particular cut from an animal (ribeye, tenderloin, etc.). This puts you, as the meat producer, into a dilemma: you want to keep a repeat customer (said restaurant), but then you have a bunch of the animal left over that has to be sold. One thing you can do to keep a restaurant owner happy, and hopefully maximize profit, is negotiate for them to buy a certain number of cuts, or maybe a certain portion of the animal. If they don't want to use certain cuts, like roasts, you might want to see if they'd be interested in buying ground; it's extremely versatile (hamburgers, meatloaf, chili), affordable, and any cut of the animal can be turned into it.

Another issue you have to face is that plastic packaging can break its seal when frozen. Admittedly, clear plastic packaging is great for presentation purposes, but it's not uncommon for the seal to break once the meat is frozen. This can lead to freezer burn and blood leaking when it gets thawed. I personally prefer butcher paper, especially for bulk orders (which is what we're trying to target for our customers in the future). You will need to think about who your target demographic is, and gear your packaging towards them. So, if it's retail consumers at your local co-op or health food store, clear plastic may be your best choice, especially if you expect a high turnover of product and you can leave the meat thawed (so you don't risk breaking the seal). But on the other hand, if

you hope to sell in bulk to individuals who plan on freezing it (and placing their order beforehand), they are probably more concerned with package quality instead of presentation, and butcher paper will be your best bet. Same goes for other retailers who will be unpackaging it for a different final product (i.e. restaurants). And finally, for those who are really health conscious and concerned about estrogens (chemicals that replicate estrogen's effects in the human body when we are exposed to them), plastic packaging is a no-go, so butcher paper is the way to go.

Lastly, USDA compliance is...well...not fun. Not fun at all. You are going to have to keep in mind that for every different label (every single different cut), you need separate USDA approval. Each one must be submitted to the USDA for approval. As well, if you want to make claims such as, Grass-Fed, Pasture-Raised, Antibiotic-Free, and the like, you must submit an affidavit declaring your adherence to the rules laid out by the USDA in order to make said claims. I know that sounds frustrating and perhaps even daunting, but there are a couple options to get around this! If you know exactly what kind of cuts you want to carry, you can get custom labels for each type. Or you can do one generic label for your brand, and then use your processor's pre-approved label for the cut; this would mean each package would have 2 labels. You can also forego having a personalized label, if you're not concerned about presentation, and just use your processor's generic label. Keep in mind, none of this necessarily applies if you only want to sell in your state and use a state inspected processing facility. (Not all states offer state inspection, though.) We opted for USDA inspection to give us the maximum flexibility to sell across state lines. In many cases, state inspected facilities have to meet similar, or the same, standards as USDA inspected facilities. The reality of it is that USDA compliance is extremely difficult for facilities to

maintain, because of the expense and bureaucracy involved, so it will narrow your choice of processors available to you if you want USDA inspection, since many just choose to not to deal with it. Not only that, but processors must be certified for each kind of animal they process, so they must also be certified to process yak meat, not just beef. It's just one of the joys of the breakdown of federalism and the separation of powers that we are blessed to contend with in modern America. If all of this is more headache than you want to deal with, I recommend finding a USDA compliance specialist; if you find a good one, they can save you hours of headache and labor.

So, these are some tips that are scratching the surface for yak meat processing and selling. I am by no means an expert or authority on this issue, so if you have any tips/tricks that I could benefit from, please feel free to reach out to me at vance@hkyakranch.com. Same goes for any questions! Next time I'll probably write about jerky selling, unless there is another topic requested by popular demand.

Vance "Michael" Hawk is Director of Operations at HK Yak Ranch, based in Sundance, WY near Devil's Tower. He is currently in the Air Force, but planning to separate soon and work the ranch full time.





Animal Fiber:

Here is a list of key terms and definitions to help you sort out all things fiber!

Kat Tylee

1. Batt/batting: A form of prepared fiber, ready to spin or as an intermediate step in getting ready to spin. Batts come from carding equipment, are light and airy, and the fibers are somewhat aligned, but overall are more helter-skelter. Think of a quilt batt.
2. Card: Carding is a way to separate the fibers in preparation for spinning. This method is used both industrially and in hand spinning, although they are different in scale and tools. Fibers prepared by carding are arranged in different directions and not parallel to each other. Carded fibers are generally spun woolen style.
3. Carding cloth: a rubberized fabric with stainless steel teeth embedded in it.
4. Chalky: Fiber that is chalky or has a chalklike surface lacks luster.
5. Clip: Used mostly in the wool industry referring to shearing. Generally, in reference to a whole flock shorn at one time. One season's yield of wool.
6. Combing: 1. A second stage of fiber preparation for spinning after carding. This step removes short fibers and lines up the fibers parallel to each other. The result is a smooth feeling yarn that is dense and has less air. Combed fibers are usually spun worsted style. 2. A method of gathering fiber from an animal by using a comb to collect the fiber as it is naturally shed.
7. Cotted fleece: A fleece in which the fibers are matted or tangled.
8. Coverage: The amount of fiber produced across an animal. All harvest sites should produce harvestable fiber.
9. Crimp: Refers to the natural curvature of the individual fibers. Some animals naturally grow fiber that has a tight crimp to the fiber and other animals have a low crimp, or straighter fibers. Wool tends to be a crimped fiber whereas yak and alpaca have less crimp to it.
10. Dehairing: The process of removing longer, coarser guard hairs from a dual coated animal such as yak, alpaca, or goats. The longer and coarser hairs are less comfortable for use in garments and therefore are generally less desirable for fiber production.
11. Density: The number of individual fibers on the animal. More hair per square inch means a denser coat. For fiber production, a higher density of down is desirable. This term may be used in relation to fiber coverage on an animal.
12. Down: The ultra-fine fiber a dual or tri -coated animal produces as an under-coat. This is generally the desired fiber. Cashmere, yak, camel, and bison are all examples of down fibers.
13. Drape: Used in reference to how a finished product hangs and behaves. This is influenced by the fiber and by the technique used to produce the product. The more the stitches move in relation to each other the more drape a product has.
14. Elasticity: The amount of stretching a fiber can do without breaking and returning to its original shape and length. Wool tends to have more elasticity than other fibers, but not all wools have the same amount of elasticity.
15. End Product: Final point in the process. In textiles, this is thought of as a knitted, woven, or felted product, although woven or felted cloth may have one more step and be sewn into an end product like clothing. Example: You can have a worsted spun, worsted weight yarn. You can also have a worsted weight yarn that is woolen spun.
16. Felt: A textile in which fibers have been joined together and cannot be pulled apart. This can be done intentionally or accidentally using heat, moisture, agitation and a bit of soap. In felting, the fibers lock into the other fibers, this is a permanent condition. Some fibers felt easily and some resist felting. Wool tends to felt well, although not all wools felt.
17. Fiber diameter: Thickness of the individual fibers. Natural fibers are inherently variable in diameter, but the average fiber diameter of any sale lot is by far the most important characteristic in terms of processing value.
18. Fiber Mill: A location used for the spinning and/or weaving of fibers into textiles. Usually based around wool. Note, mills come in all sizes from mini mills to large factory productions all of which tend to specialize in a particular product.
19. Fleece: the coat of wool from a wool-bearing animal obtained by shearing. Differs from pelt or shearling. See Pelt and Shearling.
20. Flick: a method of opening up locks for spinning so the fibers don't stick together and yet remain in the same relative position in which they grew.
21. Full: Washing of a fabric, generally woven, under conditions like those used to produce felt but stopping short of creating felt. Used to fill in air spaces between individual yarns and create a unified fabric.
22. Grade: The quality or relative fineness of wool. Defined by USDA and ASTM Standard Specification D3991.
23. Grading: Classifying the fleece according to fineness.
24. Grease: Lanolin and a suint (sheep sweat) mixture in the fiber that is secreted from the skin. Lends a waterproofing tendency to the fiber. Some animals have more grease than others even within sheep breeds and individual animals. Animals such as yak, alpaca, and rabbit do not have this grease.
25. Grist: A yarn's thickness.
26. Guard hairs: Coarse, water-repellent fibers that overlay and protect the downy undercoat. Found in some sheep breeds, musk oxen, camels, and yaks.
27. Hair: Straight, non-elastic, and glassy. Stronger and usually coarser than wool. Lacks felting properties.
28. Handle: A subjective term in reference to how the fiber handles and feels as one works with it and assess all the attributes that comprise quality, such as fineness, length, and elasticity. Used in fiber judging.
29. Heterotypic hair: A type of hair that changes consistency with the season. More wool-like in the winter for warmth and more

- hair-like for the summer to shed rain. Results in fiber harvest that can be variable depending on the time of year when the harvest is taken.
30. Kemp: A coarse, hollow fiber found in the fleeces of some sheep breeds. Kemp is brittle and has less elasticity. It also takes dye differently than the rest of the fleece. Tends to be considered a contaminate.
 31. Length/Staple: Refers to the length of the fibers in a fleece or on the animal from tip to base. Wool is most desirable in the two inch or longer range but should not be so long as to be a detriment of processing. Some animals produce a staple length of a half an inch; such as yak and some longwool sheep breeds or alpacas can produce staple lengths of up to 15+ inches (38 centimeters). Yak also have long staple lengths of fiber on their skirts, but the most desirable down fiber ranges from a half an inch to two inches (1 – 4 cm) with an average of about one and a half inches (3 cm). For showing an animal or a fleece, the key is to have a uniform staple length in all the harvested fiber.
 32. Locks: Natural divisions in a fleece composed of small clumps of fiber that hold together.
 33. Loft: Airiness of a yarn, lock, or fleece. Higher loft means more airiness and generally warmer finished products due to the insulating properties of the air.
 34. Luster/lustre: The shininess of a fiber. Relates to the fiber's ability to reflect or absorb light.
 35. Medulla: In mammals, the mostly continuous cellular marrow inside the hair fibers that is in most medium and coarse fibers.
 36. Medullated fiber: Animal fiber containing a core portion, the medulla, that causes the fiber to be stiffer than nonmedullated fibers.
 37. Micron: A micron is a unit of measure in the metric system. It equals one-millionth of a meter and one-thousandth of a millimeter. It is a shortened word for micrometer. Written as "µm".
 38. Nep: A tangled knot of short broken fibers
 39. Noil: The short fibers removed in combing. Usually refers to wool but can be in cotton, silk, or rayon.
 40. Non-medullated fiber: Animal fiber that does not contain a medulla. Tends to be fine in diameter.
 41. OFDA: Optical-based Fibre Diameter Analyzer
 42. OFDA2000: A portable lab instrument capable of testing fiber for *Average Fiber Diameter* (in micron), variability of fiber diameter and fiber diameter variability along the entire length of the fiber, comfort factor, and many other measured traits.
 43. Overdye: To dye one color over another
 44. Pick or tease: Plucking the locks or fibers apart to fluff them up and separate any spots that are stuck together.
 45. Ply: Layer or strand. Rope and yarn are made by twisting plies together to create a larger, stronger, and more balanced yarn or rope.
 46. Quality: The average diameter or fineness of wool/fiber.
 47. Raw fiber: Fiber that is straight off the animal without having been processed in any way.
 48. Rolag: Fiber that is prepared for spinning with the use of hand carders. The carded fiber is rolled into a sausage like roll.
 49. Roo: To pluck the wool from a sheep after the fiber has loosened and is naturally shedding. This can only be done from sheep that retain the primitive characteristic of seasonally shedding.
 50. Roving: Fiber that is washed and carded and ready to spin. Generally, a mill preparation and long lengths of carded fiber in about an inch to two-inch diameter bundle. Used to spin woolen yarns.
 51. Scorecard: The card which contains the standard used with which to judge either an animal or the fiber from the animal.
 52. Scour: Washing wool but in the most thorough stage. This is the complete removal of all lanolin and suint enabling the fiber to be processed by mechanical equipment.
 53. Second cuts: When a shearer takes a second pass with the shears or clippers and the cuts don't land in the same location. This results in small, short bits of wool that cling to the fleece. If they stay in the fleece, they can make it difficult to spin a smooth yarn.
 54. Shearing: The process of cutting the fiber off of an animal with clippers or scissors.
 55. Skirting: A practice of removing off-sorts from the fleece, such as stained or inferior fiber.
 56. Sound fiber: Fiber of any quality that is strong in staple.
 57. Style: This is a subjective reference to how the fiber looks and feels. Often used in reference to how crimp a fiber is. Many fiber artists believe the more crimp a fiber has the better it is.
 58. Tender fiber: Fiber having weak places in the fibers and consequently limiting the use of the fiber.
 59. Top: Clean and combed fibers aligned to spin. Used to spin worsted yarns.
 60. Vegetable Matter: Burrs, seeds, hay, etc., that may be in the wool. These are generally considered contaminates as they can make the wool/fiber more difficult and costly to process.
 61. Waste/Drop: The fiber considered inferior or too contaminated by foreign matter to be made use of. Often literally ends up on the floor of the mill and thrown in the trash. Depending on the stage where this fiber is pulled out of the process it may become an off-sort and be used in another manner. For example, short fibers (second cuts) may be used as felt instead of yarn.
 62. Woolen: Within yarn construction, woolen refers to the method of preparation and spinning that incorporate a lot of air, are lightweight, and have high insulations qualities. Fibers are arranged by the card to encourage the maximum air to fiber ratio.
 63. Worsted: 1. When referring to spinning, a worsted yarn is prepared and spun to enhance the sleekness and draping qualities of the fibers. Combing is the preparation used to create a worsted yarn. 2. This term can also refer to a particular weight, or size, of yarn, regardless of how it is spun.
 64. Yield: The amount of clean fiber left after the vegetable matter, grease, and other contaminants have been removed.

*You can find this and other valuable information on the Face Book page: **Pasture to Product***



Yak Roving

News, Updates, Information, and Accomplishments in Science!

An animal registry such as USYAKS is an important resource for yak owners and breeders and should strive to serve the needs of people who raise yaks. Individual yak owners can always strike out on their own, but it takes the teamwork of an organization to see the big picture, and it's important that someone looks out for the welfare of the yaks themselves. That's the duty of our Association. At USYAKS, we try to have your yak's "back". The Association uses science to look out for the yaks. Below is a list of twelve ways the Association has used, or is using, science to do just that.

Registration DNA Test: The genetic test that we use for registration was developed at about the same time that USYAKS was created. USYAKS Professional Members Dr. Ted Kalbfleisch and Dr. Jessica Petersen were instrumental in its creation. This DNA test determines parentage, measures cattle genes presence, and offers help in measuring in-breeding.

Yak Reference Genome: USYAKS was instrumental in creating the most complete genome assembly ever accomplished on a mammal. A new genetic technique called trio-binning was used in the study, and an USYAKS registered yak, Molly, owns that genome. Future yak genetic work involving scientists anywhere in the world, will likely use Molly's DNA as a roadmap.

Yak Metabolism: USYAKS members supplied samples to Jessica Petersen in order to measure possible metabolic differences between yaks carrying two different types of mitochondria. The mitochondrion is the cell organelle that converts nutrients into energy. Mitochondria differ between species. A mitochondrion has its own DNA, separate DNA from the DNA in a cell's nucleus. Mitochondria normally appear only in an egg, not in the sperm; consequently, mitochondria are passed only along the maternal line. Most North American yaks have mitochondria that can be traced back to *Bos indicus* (Asian) cattle. This is how we know that domestic yaks are consequential to ancient Asian hybridization. The wild yak species *Bos mutus* has a different mitochondrion than their distant *Bos indicus* cousins. Jessica Petersen studied the difference in metabolism between yaks with *Bos mutus* mitochondria and those with *Bos indicus* mitochondria.

Skim Sequencing: Our occasional annoying delays getting DNA processed at GeneSeek is mostly related to the amount of individual man hours that they require to process our yak DNA. Ted Kalbfleisch is working on developing a new process that will be less labor intensive at the GeneSeek lab. It would mean that yak DNA could be processed quickly along with thousands of cattle DNA samples. This process is called "skim sequencing" or "low-pass sequencing". It amounts to whole genome sequencing on selected parts of the DNA. When (if?) this is completed, we will have fast turn-around time and far more genetic information available to the scientists for each individual yak. This tool has great potential in helping us maintain the purity and diversity of the North American yak herd.

Yak Nose Color Genetics: Jessica Petersen was able to isolate the gene that causes black pigmentation (imperial phenotype) in the yak nose. We hope that this will be incorporated into a future version of our genetic registration test. The imperial gene is a dominant gene, so you can't tell, by looking, if an imperial yak has one copy of the imperial gene or two copies. If you are trying to breed only imperials, you'll want to know! Hopefully, that's on its way.

Match-A-Yak: The written statement of USYAKS Vision and Values requires the Association to preserve the purity and diversity of yaks through science. The Registration DNA test is meant to be used to maintain the genetic purity of the North American yak herd. Using science to maintain genetic diversity is also very important. As a member of USYAKS you can log into the membership portion of the website and access a program called Match-A-Yak. This computer program is designed to help you make informed decisions to avoid in-breeding. This program is a very strong tool, and even stronger if you use it with your pedigree information. If you decide to breed for specific traits such as nose-color, fiber, size, etc., you are narrowing an already narrow gene pool. Please use this tool!

Deafness in Royal Yaks: Yak owners have long suspected that some of their royal yaks were deaf. A royal yak carries the piebald coloration pattern; in other species deafness occasionally or often exists in association with the piebald coat-color-pattern. Piebald deafness is very complicated genetically. In other species, hearing parents can produce deaf offspring, and two deaf parents can produce hearing offspring, this also seems to be true with yaks. At the last National Western Stock Show (Professional Member) Dr. George Strain was able to document deafness in some royal yaks. This is the first time that deafness in royal yaks has been scientifically demonstrated. The study will soon be published in the *American Journal of Veterinary Research*. Since our yaks are pedigreed and the gene pool is narrow, it's possible that yaks will provide a clue to the genetics behind coat-color-pattern related deafness. Jessica Petersen is planning to do a few whole genome sequences to start this investigation. Skim sequencing might be a very strong tool in uncovering some new knowledge about this phenomenon.

Availability of EHD Vaccine: A new EHD vaccine has been available to owners of captive deer herds, and in 2022 is now available to owners of yak herds. Yak owners are using it this year. The vaccine shows great promise in protecting yaks from EHD, while avoiding the problems that occurred in earlier attempts to create an EHD vaccine. EHD and the new vaccine have both been subjects of earlier Newsletters. If you have white-tail deer die-offs in your area, you probably live in an area with EHD. Be careful not to confuse EHD with Chronic Wasting Disease (CWD). CWD is related to Mad-Cow disease. The genetic test that we use for registration already screens your yaks for prion related diseases like Mad-Cow and CWD.

Further EHD Research: EHD is a hemorrhagic disease in yaks; Ebola is a hemorrhagic disease in people. Both can be deadly. Recent research has shown that Ebola virus can be present in the semen of men who have recently recovered from Ebola; sexual transmission has been verified. You can read about it here: <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1003273> This raises two natural questions. Can EHD virus be found in the semen of yak bulls that have recently recovered from the disease? Is sexual transmission of EHD possible? USYAKS has provided semen from yak bulls in an early attempt to seek answers to these questions. If you have a yak bull that has recently survived an encounter with EHD, let us know!

Yak Husbandry: Greg Dike has teamed up with the University of Kentucky in a number of projects involving yak nutrition, artificial insemination and other important areas of yak husbandry. You've likely received emails on these subjects and have seen posts on the USYAKS Facebook page. Stay tuned, there's a lot of exciting new work going on in Kentucky!

Yak Fiber Studies: Yaks are known to provide one of the world's finest natural fibers; until recently there hasn't been any significant scientific studies of this subject. Two professional members of USYAKS have undertaken studies of yak fiber. In the US, for several years Katrina Tylee has been gathering fiber samples, and sending the fiber to a laboratory for scientific analysis. If you would like to participate contact Kat: LittleHawkYarns@gmail.com On the opposite side of the Earth, Shakoor Ali is also collecting fiber in a comprehensive yak fiber study at the University of Baltistan.

Planning for New Genetics: Several years ago, USYAKS teamed up with the Lincoln (NE) Zoo, in an attempt to bring wild yak semen into the United States. Due to bottlenecks apparently caused by bureaucracy in India, this project seems to have stalled. Europe would be the easiest source for semen, but North American yaks originally came here from Europe. It's possible that semen from Europe might do very little to broaden the gene pool of our collective herd. It's also possible that European yaks could now show more evidence of cattle gene introgression than is shown by our North American yaks. Proceeding wisely and getting the most bang-for-the-buck will require a lot of scientific investigation. The Science Committee has begun to consider these issues.

Updates and Reminders!

EHD Vaccine



This is the first year that the EHD vaccine has been used on yaks. It takes about three months from the time you order the vaccine until it becomes effective, given that you must allow one month after ordering the vaccine for Medgene Lab to obtain the required approvals, at least one month to administer two shots, and then about a month for the vaccine to reach peak efficacy. EHD season starts in late summer and lasts until the first good freeze in the fall. This means that it is likely to late to order the vaccine for this year. Information about EHD is included in the last several Newsletters. If you want a refresher, those Newsletters are available on the website. To request the vaccine, please write to Ashley Petersen: Ashley@Medgenelabs.com or contact her at (605) 692-1268.



Fiber Study continues...send your fiber samples to:
Kat Tylee, 1409 SE Hamilton St., Roseburg, OR, 97470
Questions? Email Kat: littlehawkyarns@gmail.com



Show off your yaks!
Send your photo submissions for inclusion in the newsletter to: unadtaylor@gmail.com

Sage Hill Yaks



Do your part! Join a committee! Contact information below.
Fiber: Open position
Marketing: Greg at nct1108@yahoo.com
Meat: Vance at vance@hkyakranch.com
Science: Peter at hackett@hypoxia.net
Exhibitions and Shows: Brad at tci@juno.com



<https://www.usyaks.org/tracking-of-birth>
The association is still collecting information to track the birth of abnormal calves. Please continue to report any incidences of abnormalities to USYAKS via this link: [Tracking Abnormal Calves \(usyaks.org\)](https://www.usyaks.org/tracking-abnormal-calves)



The Board of Directors meets *via Zoom* the first Wednesday of each month at 7pm Mountain time.
All Association members are welcome to attend these video conference meetings.
The membership elects the Board of Directors, each of whom serve for a term of three years.
The Board of Directors selects its own officers annually.
You can view the list and bios of the Board of Directors here: <https://www.usyaks.org/board>